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A NEW PLIOCENE STRUTHIOLARIID (GASTEROPODA) FROM FLINDERS ISLAND, TASMANIA

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Abstract

Tylospira (Singletonaria) gilli sp. nov. is described, and the classification of the family Struthiolariidae discussed.

Description

The fine shell selected as holotype of the species here described was sent by Mr. E. D. Gill to the New Zealand Geological Survey for examination early in 1957. As it was then the only known specimen, the writer was uncertain as to the taxonomic value of the unusual combination of characters shown. Four additional specimens, collected by Mr. R. W. T. Wilkins in March 1958, comprise an adult, two adolescents, and a spire fragment, all adding useful information on the species. The writer is indebted to Mr. E. D. Gill and to Dr. C. A. Fleming for the opportunity of studying these interesting fossils.

Family Struthiolariidae Fischer 1884

Genus **Tylospira** Harris 1897

Type species: *Buccinum scutulatum* Martyn, Recent, New South Wales.

Subgenus **Singletonaria** Marwick 1952

Type species: *Struthiolaria lirata* Tate, Pliocene, Victoria.

Tylospira (Singletonaria) gilli sp. nov.
(Fig. 1a, b)

Shell of moderate size, broadly oval, whorls convex; body-whorl beaked abapically. Protoconch scaphelloid, nucleus large, irregular. Sculpture of numerous

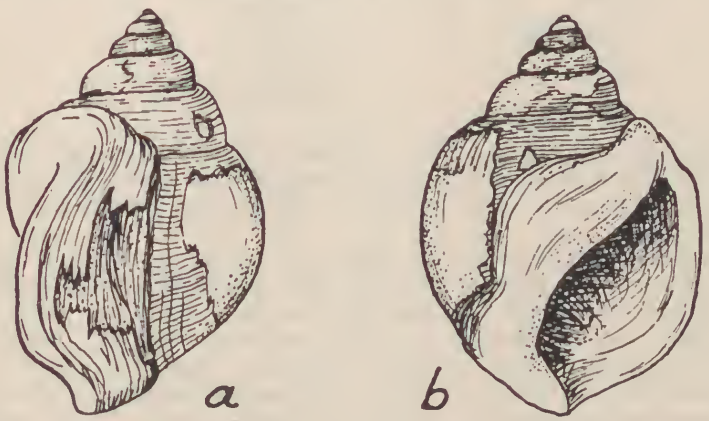

Fig. 1.—*Tylospira (Singletonaria) gilli* sp. nov. Pliocene, Flinders I., Tasmania. × 1.

spiral cords, no axials. Aperture pyriform, channelled adapically, broadly sinused abapically. Outer lip only slightly sinuous, thickened in adult and growing forward with a smooth surface, showing low, irregular growth-ridges for about one-eighth whorl. Apertural callus rising adapically on penultimate whorl and expanding parietally to form broad, well-defined pad, and again basally, opposite concave columella.

Holotype (P17870) and 4 paratypes (P17652-5) in National Museum of Victoria, Melbourne.

Collectors. Holotype, G. M. Dinmock; paratypes, R. W. T. Wilkins.

Locality. Lime quarry at foot of The Dutchman, Flinders I., Tasmania.

Age. Pliocene (probably epi-Kalimnan).

Classification

The new species seems to be more closely related to *Singletonaria* than to any other Struthiolariid, but the best way to express this relationship in generic classification is open to question, and involves a consideration of the whole family. The family Struthiolariidae comprises 8 named genera and subgenera that have been differently ranked and grouped by different writers. Four of these taxa are founded on living species, but are known also as fossils. *Conchothyra* occurs only in the Upper Cretaceous, *Perissodonta* in the Upper Cretaceous and Cainozoic, and the rest of the taxa in the Cainozoic.

The anatomy of the living species has been placed on an exceptionally sound footing by J. E. Morton (1950, 1951, 1956a, b) so that the inter-relationships of *Struthiolaria, Pelicaria, Perissodonta,* and *Tylospira* are relatively well known. The chief difficulty now is to reach some uniformity in generic-subgeneric ranking. This is, of course, a universal problem, but it is none the less real in the Struthiolariidae because the family is a small one.

Morton (1956a, p. 523) showed that the South Georgia-Kerguelen *Perissodonta* is more widely separated anatomically from the New Zealand *Struthiolaria* and *Pelicaria*, also from the Australian *Tylospira*, than these are from each other, and he suggested the following classification:

Genus	Subgenus
Struthiolaria	*Struthiolaria*
	Pelicaria
	Tylospira
	Callusaria
	Singletonaria
Perissodonta	

Morton drew attention to primitive anatomical characters in *Perissodonta*, and to these may be added the equally primitive conchological character, a strongly parasigmoid outer lip, such as possessed by the ancient genera *Conchothyra* and *Monalaria.*

Conchologically, *Tylospira* also stands out from *Struthiolaria* because of its peculiar kind of adult growth. This has been briefly referred to earlier (Harris 1897, p. 223; Marwick 1924, p. 166) but seems worth further study. There is a great difference in the disposition of the apertural callus of *Tylospira scutulata* compared with that of *Struthiolaria*. When the *Struthiolaria* shell reaches adult size, an important change takes place in the apertural margin. Previously relatively thin, it now becomes strongly reinforced. This is effected by the outer-lip being sharply reflexed, and the convex margin so formed receiving layers of callus until it becomes thick and strong. This apertural callus extends adapically well above

the line of suture to form a thick pad that restricts the adapical end of the aperture to a narrow channel. Parietally the callus is thinner, but on the base it forms another thick pad and extends down the concave columella forming a strong beak. That the reinforcement adds greatly to the strength of the shell is well shown by the common use by the ancient Maori of detached *Struthiolaria* apertures as ring ornaments.

In the New Zealand Upper Miocene-Recent *Pelicaria*, the apertural callus develops in much the same way as in *Struthiolaria*, but in the Oligocene-Pliocene *Callusaria*, it is greatly exaggerated, especially in the type species, *callosa* Marwick. Basically, however, the pattern remains the same in all three groups.

In *Tylospira*, on the other hand, when the shell is about half-grown, the outer-lip is slightly reflexed and a moderate coating of callus is deposited on the convex edge. As in *Struthiolaria*, the callus extends adapically, parietally, and basally, but it remains thin all over the inner lip so formed. The shell then continues to grow by increments of the glazed callus on the edge of the outer-lip and the end of the columella. Owing to some change in the part of the mantle that produces the surface sculpture, well-defined spiral cords and axial shoulder tubercles are no longer formed, weak spiral cords and cingula and low irregular, sinuous growth-ridges taking their place. In *T. scutulata* this kind of growth goes on for about two whorls.

Weathered examples of *Tylospira coronata* show a glazed, finely grained, outer layer to the callus, much of it about 0·2 mm. thick, under which is a dull layer showing sharply defined growth-ridges and only vague spirals. This layer forms a normal, abutting suture with the corresponding layer of the preceding whorl; but the outer, glazed layer covers this suture completely and ascends half-way up the preceding whorl. This gives the impression that the under-layer grows forward in the usual way, and then much of the body is smeared over with callus. But growth-lines on the callus along the outer margin of the lip indicate that the secreting part of the mantle does not extend past this outer margin on to the external surface of the body for more than 2 or 3 mm. Precise details of the manner of growth are hard to envisage from the shell alone and observations of the actual animal during growth would obviously be of great interest.

This kind of growth, which may conveniently be termed tylospirid, occurs to different extents in all Australian Struthiolariids except *Singletonaria lirata*. A modification of it is shown by *Conchothyra* which, however, has a much thicker callus, the inner lip finally burying the spire and, as originally noted by Hutton, producing in *C. parasitica* an almost planorbid condition. Further, *Conchothyra* does not seem to have had the highly glazed surface with obsolete spirals.

None of the New Zealand Tertiary groups, comprising over 40 named species and subspecies, developed the tylospirid habit of growth. It is true that in some heavily callused specimens of *Callusaria* the outer-lip did grow forward as much as one-sixteenth whorl; but the inner-lip is equally thick, so that only a gerontic restriction of the aperture resulted. The absence of true tylospirid growth from any *Struthiolaria*, *Pelicaria*, or *Callusaria*, therefore, suggests that the Australian and New Zealand Struthiolariids have been separated for a considerable part, perhaps most, of the Tertiary. The history of the family throughout the Tertiary is comparatively well known for New Zealand but not for Australia. This is probably due rather to want of suitable pre-Upper Miocene facies in the known Australian record than to Upper Miocene invasion.

To grant tylospirid growth generic importance as a taxonomic character and then to class the new species showing such growth along with *Singletonaria lirata* in which it is not known seems inconsistent. However, *gilli* agrees so closely with

lirata in shape, sculpture, protoconch, and restrained outer-lip sinuses that the two species must be closely related. Even the denticles on the outer-lip of *T. lirata*, that formerly impressed the writer as being important, are but the impress of the spiral sculpture. In that it represents an increase in the deposit of the apertural callus, the relationship of *gilli* to *lirata* parallels that of *Callusaria* to *Struthiolaria*, and from this viewpoint a subgenus for *gilli* may be justified. Nevertheless the restraint advocated by Morton (1956a, p. 523) in the proposal of monospecific generic names is to be borne in mind. *Callusaria* is established as a well-defined lineage separated from *Struthiolaria* at least since the Oligocene (*S. otaioica* Laws), lasting until the Pliocene, and having 10 named species and subspecies. Until more is known about the pre-Pliocene ancestors of *lirata* and *gilli* no great harm will result in the two being classed under *Singletonaria*.

The writer proposed *Singletonaria*, originally, as a full genus because of 'uncertainty as to its nearest relatives', but this uncertainty is now to a certain extent lessened. The denticles on the outer-lip seemed at that time to be a unique character, but further study shows that, indeed, they are connected with the tylospirid habit, being a subdued expression of the spiral cords resulting from the change to this manner of growth. They can be seen, though very faintly, on the outer-lip of adolescent *Tylospira scutulata*, thus supplying a significant connecting link quite consistent with the geographic situation.

The following classification of the family is proposed:

Genus	Subgenus
Conchothyra (Up. Cret., N.Z.)	
Perissodonta (Up. Cret.-Eo., N.Z.; Olig.-Plio., Patagonia and Grahamland; Rec., Kerguelen and S. Georgia)	
Monalaria (Eo., N.Z.)	
Struthiolaria (Olig.-Rec., N.Z.)	*Struthiolaria* (Mid. Olig.-Rec., N.Z.) *Callusaria* (Up. Olig.-Plio., N.Z.) *Pelicaria* (Up. Mio.-Rec., N.Z.)
Tylospira (Mio.-Rec., SE. Australia	*Tylospira* (Up. Mio.-Plio., Vic., Tas., S.A.; Rec., N.S.W.) *Singletonaria* (Plio., Vic. and Tas.)

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